

Appendix C

**Construction and Operations Emission  
Estimates for the Kirby Hills Natural  
Gas Storage Project**



URBEMIS2002 Construction Emission Estimates

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URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Kirby Hills Metering Station.urb  
Project Name: Kirby Hills Metering Station  
Project Location: Lower Sacramento Valley Air Basin  
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT  
(Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2006 ***							
TOTALS (lbs/day,unmitigated)	8.20	59.17	64.18	0.00	12.64	2.64	10.00

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URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Kirby Hills Metering Station.urb  
Project Name: Kirby Hills Metering Station  
Project Location: Lower Sacramento Valley Air Basin  
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT  
(Pounds/Day - Summer)

Construction Start Month and Year: May, 2006  
 Construction Duration: 1.5  
 Total Land Use Area to be Developed: 1 acres  
 Maximum Acreage Disturbed Per Day: 1 acres  
 Single Family Units: 0 Multi-Family Units: 0  
 Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	10.00	-	10.00
Off-Road Diesel	8.16	59.10	62.99	-	2.64	2.64	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.04	0.07	1.19	0.00	0.00	0.00	0.00
Maximum lbs/day	8.20	59.17	64.18	0.00	12.64	2.64	10.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	4.02	24.44	34.15	-	0.88	0.88	0.00
Bldg Const Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	4.02	24.44	34.15	0.00	0.88	0.88	0.00
Max lbs/day all phases	8.20	59.17	64.18	0.00	12.64	2.64	10.00

Phase 1 - Demolition Assumptions: Phase Turned OFF

Phase 2 - Site Grading Assumptions

Start Month/Year for Phase 2: May '06

Phase 2 Duration: 0.2 months

On-Road Truck Travel (VMT): 0

Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Rollers	114	0.430	8.0
1	Rubber Tired Dozers	352	0.590	8.0
1	Scrapers	313	0.660	8.0

Phase 3 - Building Construction Assumptions

Start Month/Year for Phase 3: May '06

Phase 3 Duration: 1.3 months

Start Month/Year for SubPhase Building: May '06

SubPhase Building Duration: 1.3 months

Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Cranes	190	0.430	8.0
2	Rough Terrain Forklifts	94	0.475	8.0
1	Trenchers	82	0.695	8.0

Start Month/Year for SubPhase Architectural Coatings: Jun '06

SubPhase Architectural Coatings Duration: 0.1 months

SubPhase Asphalt Turned OFF

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Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

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URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Kirby Hills Pipeline  
Construction within YSAQMD.urb  
Project Name: Kirby Hills Pipeline Construction within Yolo-Solano AQMD  
Project Location: Lower Sacramento Valley Air Basin  
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT  
(Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2006 ***							
TOTALS (lbs/day,unmitigated)	10.44	73.49	83.30	0.00	43.10	3.09	40.01

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URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Kirby Hills Pipeline  
Construction within YSAQMD.urb  
Project Name: Kirby Hills Pipeline Construction within Yolo-Solano AQMD  
Project Location: Lower Sacramento Valley Air Basin  
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT  
(Pounds/Day - Summer)

Construction Start Month and Year: July, 2006  
Construction Duration: 1  
Total Land Use Area to be Developed: 13 acres  
Maximum Acreage Disturbed Per Day: 4 acres  
Single Family Units: 0 Multi-Family Units: 0  
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	40.00	-	40.00
Off-Road Diesel	10.33	73.31	80.32	-	3.09	3.09	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.11	0.18	2.98	0.00	0.01	0.00	0.01
Maximum lbs/day	10.44	73.49	83.30	0.00	43.10	3.09	40.01
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Bldg Const Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max lbs/day all phases	10.44	73.49	83.30	0.00	43.10	3.09	40.01

Phase 3 - Building Construction Assumptions: Phase Turned OFF

Phase 2 - Site Grading Assumptions  
Start Month/Year for Phase 2: Jul '06  
Phase 2 Duration: 1 months  
On-Road Truck Travel (VMT): 0  
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
2	Cranes	190	0.430	8.0
2	Other Equipment	190	0.620	8.0
2	Tractor/Loaders/Backhoes	79	0.465	8.0
2	Trenchers	82	0.695	8.0

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Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction



**Kirby Hills - Lodi Gas Storage Project Emissions of BTEX and Formaldehyde**

I. Compressor Engines

Pollutant	emission factor (lb/MMBtu) <sup>1</sup>	max emission rate (grams/sec)	Worst Case Concentration (ug/m <sup>3</sup> ) @ 1gram/sec	Estimated Concentration (ug/m <sup>3</sup> )	Acute	Acute Risk	Chronic	Chronic Risk	Cancer	Cancer Probability
benzene	1.58E-03	3.65E-03	10.3	3.76E-02	1300	2.89E-05	60	6.27E-05	2.90E-05	1.09E-07
toluene	5.58E-04	1.29E-03	10.3	1.33E-02	37000	3.59E-07	300	4.43E-06	N/A	N/A
ethylbenzene	2.48E-05	5.73E-05	10.3	5.90E-04	N/A	N/A	2000	2.95E-08	N/A	N/A
xylene	1.95E-04	4.51E-04	10.3	4.64E-03	22000	2.11E-07	700	6.63E-07	N/A	N/A
formaldehyde	2.05E-02	4.74E-02	10.3	4.88E-01	94	5.19E-03	3	1.63E-02	6.00E-06	2.93E-07

<sup>1</sup> IC Engine emission factors from U.S. EPA AP-42 Emission Factors (U.S. EPA 2000)

II. Dehy boilers

Pollutant	emission factor (lb/mmcf) <sup>1</sup>	max emission rate (grams/sec)	Worst Case Concentration (ug/m <sup>3</sup> ) @ 1gram/sec	Estimated Concentration (ug/m <sup>3</sup> )	Acute	Acute Risk	Chronic	Chronic Risk	Cancer	Cancer Probability
benzene	0.0185	3.11074E-06	25.2	7.84E-05	1300	6.03E-08	60	1.31E-07	2.90E-05	2.27E-10
toluene	0.0059	9.92074E-07	25.2	2.50E-05	37000	6.76E-10	300	8.33E-09	N/A	N/A
ethylbenzene	not available				N/A		2000		N/A	N/A
xylene	0.0022	3.69926E-07	25.2	9.32E-06	22000	4.24E-10	700	1.33E-09	N/A	N/A
formaldehyde	0.0409	6.87726E-06	25.2	1.73E-04	94	1.84E-06	3	5.78E-06	6.00E-06	1.04E-10

<sup>1</sup> Emission factors for boilers < 10 MMBtu/hr from Ventura County APCD reference for AB2588 emissions inventories. No factors available for ethylbenzene

